REMARKS

In the office action dated May 5, 2003, the Examiner indicated that the amendment filed on 3/17/2003 was non-responsive because the Applicant overlooked the various indefiniteness rejections set forth on page 3 of the office action. The Examiner indicated that the Applicant is given 30 days to file a supplemental response in order to correct the above-noted problem. Therefore, the response/amendment included herein incorporates all of the material submitted in the amendment filed on 3/17/2003 in addition to the corrections to the above-noted problem. The claims have been further amended to reflect the Examiner's comments and overlooked indefiniteness rejections set forth on page 3 of the office action dated 3/17/2003.

I. Rejections Under 35 U.S.C. §112

In the above-captioned Office Action, the Examiner rejected claims 1-29, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicants regards as the invention.

With respect to claim 1, the Examiner argued that in claim 1, it appears that the steps of "applying the offset correction voltage" and "compensating the voltage at the non-inverting input" are actually the same step. The Examiner stated that it is not clear how these two steps are separate from one another, or how they would both read on the disclosed embodiments. Moreover, the Examiner argued, the step of "compensating" on the last four lines of claim 1 does not appear to be a step at all, but rather just the end result of the actual steps of the invention.

Applicant has amended claim 1 so that claim 1 is now directed toward a method for signal-conditioning utilizing a signal-conditioning circuit, wherein the method comprises the steps of applying an offset correction voltage to a non-inverting input of a signal-conditioning circuit; and applying a magnetoresistor half-

bridge signal to an inverting input of the signal-conditioning circuit, wherein the offset correction voltage at the non-inverting input compensates to drive an output voltage of the signal-conditioning circuit to an input voltage divided by a value of two by calibration for temperature compensation thereof by the signal-conditioning circuit. Thus "compensation" is a result of the steps outlined in claim 1, rather than a step by itself. The Applicants therefore believe that the rejection to claim 1 under 35 U.S.C. 112 has been traversed. Applicants thus request that the rejection to claim 1 under 35 U.S.C. §112 be withdrawn.

With respect to claim 3, the Examiner argued that it appears that the step on lines 3-4 has already been set forth in claim 1 at lines 3-4. The Examiner asked if these two steps constitute the same thing. The Applicant submits that the step on lines 3-4 has not already been set forth in claim 1 at lines 3-4. Amended claim 3 is directed toward a single step of configuring a signal conditioning circuit to include particular elements, including a non-inverting signal input for application of offset correction voltages, and an inverting input for application of magnetoresistor half bridge signals. Amended claim 3 describes a step of actually setting up a signal conditioning circuit and is thus presented to describe the signal condition circuit in greater detail. With respect to claim 3, the Examiner additionally stated that the same is true for the step at line 5-6 of claim 3. Applicants submit that the same argument presented above applies to lines 5-6.

Also, with regard to claim 3, as well as claim 29, the Examiner indicated that the recitation of a temperature compensator is not understood because this (element) is not seen in the disclosed embodiments. The Examiner asked whether this is just an effect of the other element(s) such as the magnetoresistors. Applicants have amended claim 3 as well as claim 29 to remove the phrase "temperature compensator" and instead refer to temperature compensation as a result thereof. Applicants now believe that the rejection to claim 3 under 35 U.S.C. 112 has been traversed. Applicants thus request that the rejection to claim 3 under 35 U.S.C. §112 be withdrawn.

With respect to claim 4, the Examiner indicated that the use of the term "equivalent" magnetoresistor is improper. Applicants have therefore amended claim 4 to delete the term "equivalent". The Applicants believe that the rejection to claim 4 under 35 U.S.C. §112 has now been traversed. The Applicants thus request that the rejection to claim 4 under 35 U.S.C. §112 be withdrawn.

With respect to claims 4-8, the Examiner stated that it appears to be misdescriptive to recite that the magnetoresistors are part of the signal conditioning circuit. The Applicants refer to Fig. 1-5 of Applicants' invention and also to Applicants' specification, which refers to, for example, a circuit 150 and a circuit 80, which is described as a signal-conditioning circuit 80. It is clear from the detailed description that circuit 150 also functions as a signal-conditioning circuit. The amplifier is not the signal-conditioning circuit as the Examiner stated. The amplifier is merely a part of the signal conditioning circuit, as evidenced by, for example, FIGS. 1 and 2. The Applicants have amended claims 4-8 to more particularly describe the invention. The Applicants believe that the rejections to claims 4-8 under 35 U.S.C. §112 has now been traversed. The Applicants thus request that the rejections to claims 4-8 under 35 U.S.C. §112 be withdrawn.

With respect to claim 11, the Examiner stated that it is improper to recite that the magnetoresistors and at least one resistor are "located in" an inverting input of the amplifier. Also, in claims 11 and 28, the Examiner indicated that term "associated" is vague and indefinite. The Examiner indicated also that the same problem exists for the magnet recited in the last two lines of the claims. The Applicants have amended claims 11 and 28 to more particularly describe the invention. The Applicants believe that the rejections to claims 11 and 28 under 35 U.S.C. §112 have now been traversed. The Applicants thus request that the rejections to claims 11 and 28 under 35 U.S.C. §112 be withdrawn.

With respect to claims 12 and 26, the Examiner indicated that the term "low" is a relative term that has not been defined in the claims or the specification and thus it cannot be determined how low (or high) the temperature coefficient would have to be in order be within the scope of the claims. The Applicants have amended claims 12 and 26 to remove the term "low". The Applicants believe that the rejections to claims 12 and 26 under 35 U.S.C. §112 have now been traversed. The Applicants thus request that the rejections to claims 12 and 26 under 35 U.S.C. §112 be withdrawn.

With respect to claim 13, the Examiner stated that it cannot be determined what is meant by a "flat resultant temperature coefficient." The Examiner stated that the Applicant should amend claim 13 to make this clearer. Applicants have amended claim 13 such that claim 13 is now directed toward the step of choosing the fixed low temperature coefficient resistor <u>in series with the at least one magnetoresistor</u> to thereby obtain a flat resultant temperature coefficient thereof <u>dependent upon the fixed low temperature coefficient resistor</u>. As Applicant's specification explains, because the magnetoresistors exhibit a negative scale factor temperature coefficient and the magnet exhibits a negative scale factor temperature coefficient, the gain of the amplifier increases with the temperature. By proper choice of the fixed resistor in series with the magnetoresistors, a nearly flat resultant scale factor temperature coefficient can thus be obtained. Applicants believe that the rejection to claim 13 under 35 U.S.C. 112 has been traversed. Applicants thus request that the rejection to claim 13 under 35 U.S.C. §112 be withdrawn.

The Examiner also stated that claims 14-26 are seen to have the same type of problems noted above with regard to claims 1-13 and should be amended as well as in response to this office action. Applicants have therefore amended claims 14-17 in a similar manner to the amendments described above. Applicant thus believes that the rejection to claims 14-26 under 35 U.S.C. 112 has been traversed.

Applicants thus request that the rejection to claims 14-26 under 35 U.S.C. §112 be withdrawn.

Additionally, the Examiner also indicated that as a minor point, in claim 25, line 1, "further comprising" should be changed to – wherein --, and in claim 29, the structural and/or functional connections between the recited elements need to be set forth. Applicant accordingly has amended claim 25 to change "further comprising" to "wherein," and has also cancelled claim 29.

Therefore, Applicants respectfully request reconsideration and withdrawal of the rejections to claims 1-28 under 35 U.S.C. § 112.

II. <u>Rejections Under 35 U.S.C. §102(e)</u>

In the above-captioned Office Action, the Examiner rejected claims 1, 3-8, 14-15 and 18-22 under 35 U.S.C. §102(e) as being anticipated by Kunde et al., "Kunde" (U.S. Patent No. 6,326,781 B1). The Examiner cited Fig. 4, where the recited steps of "offset correction" and/or "compensating a voltage at the non-inverting input" are performed by the resistors 24, and the magnetoresistor half-bridge signal is provided by circuits 14 and 15. Applicant respectfully disagrees with this assessment.

Fig. 4 of Kunde does not show an offset correction voltage applied to a non-inverting input of a signal-conditioning circuit. Additionally, Kunde does not disclose a signal-conditioning circuit in which <u>an offset correction</u> voltage at the non-inverting input compensates to <u>drive</u> an output voltage of the signal-conditioning circuit to an <u>input voltage divided by a value of two by calibration</u> for temperature compensation thereof by the signal-conditioning circuit. Resistors 24 comprise variable resistors and do not perform these types of offset correction functions. As Kunde explains at col. 7, lines 6-9, the null offset voltages of bridges 14 and 15 with no magnetic field are trimmed out using trim resistors 24. Such a feature does not

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anticipate all of the functions and features described by claim 1. For similar reasons, Kunde also does not anticipate claims 3-8 and 14-15 and 18-22.

Instead, Kunde is directed toward an apparatus for sensing and indicating the angular position of a first rotor mounted for 360 degree rotation about a first axis, as indicated at col. 9, lines 29-31, which does not provide via Fig. 4, an input voltage divided by a value of two by calibration for temperature compensation thereof. Additionally, Kunde does not disclose or anticipate a temperature compensation methodology or apparatus. Applicant specifically notes that Kunde also does not disclose an InSb signal-conditioning circuit. The Applicant therefore requests that the rejection to claims 1, 3-8, 14-15 and 18-22 under 35 U.S.C. §102(e) as being anticipated by Kunde by withdrawn.

III. Rejections Under 35 U.S.C. §102(b)

In the above-captioned Office Action, the Examiner rejected claims 1-29 under 35 U.S.C. §102(b) as being anticipated by Nelson (U.S. Patent No. 5,455,510). The Examiner cited Fig. 6 of Nelson where the magnetoresistors are elements RM1 through RM4, and resistors R1 and R2 provide the offset voltage. The Examiner also noted the temperature compensation throughout the Nelson reference. Applicant respectfully disagrees with this assessment.

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Although Fig. 6 does indicate resistors R1 and R2, such resistors do not result in the formation of a signal-conditioning circuit in which an offset correction voltage at the non-inverting input compensates to drive an output voltage of the signal-conditioning circuit to an input voltage divided by a value of two by calibration for temperature compensation thereof by the signal-conditioning circuit. In fact, a division by a value of two is not disclosed in Nelson.

Although Fig. 6 of Nelson does discuss a temperature compensation circuit 62, this circuit is not a signal-conditioning circuit in which an offset correction

voltage at the non-inverting input compensates to drive an output voltage of the signal-conditioning circuit to an input voltage divided by a value of two by calibration for temperature compensation thereof by the signal-conditioning circuit. Instead, as indicated at col. 5, lines, lines 57-59, "because the resistors of the voltage divider are not temperature sensitive, voltages V7 and V8 do not vary as a function of changing temperature." Such a statement, by its vary nature, indicates that the voltage divider of Nelson is not temperature sensitive, whereas the offset correction voltage of Applicant's invention does result in a temperature sensitive circuit, and therefore assists in achieving temperature compensation via a methodology not anticipated by the temperature compensation circuit 62 of Nelson. Temperature compensation achieved by Nelson is not achieved in the same manner as Applicant's invention, and therefore Nelson does not anticipate Applicant's invention.

Applicants additionally point out that Nelson does not anticipate the use of InSb magnetoresistors in the manner taught by Applicant's invention. Therefore, Applicant believes that those claims, which are directed toward the use of InSb, should be allowed because Nelson does not anticipate them.

Applicant therefore submits that the rejection to claims 1-29 under 35 U.S.C. §102(b), as being anticipated by Nelson should be withdrawn. Applicant therefore respectfully requests withdrawal of the rejection to claims 1-29 under 35 U.S.C. §102(b).

IV. Rejections Under 35 U.S.C. §103(a)

In the above-captioned Office Action, the Examiner rejected claims 2, 11, 16 and 26 under 35 U.S.C. §103(a) as being unpatentable over Kunde. The Examiner argued that the use of InSb as the material for forming the magnetoresistors would have been obvious to those having ordinary skill in the art who knew that this is a

typical material for making magnetoresistors, of which fact official notice is taken thereof by the Examiner. The Applicant respectfully disagrees with this assessment.

Kunde does not show an offset correction voltage applied to a non-inverting input of a signal-conditioning circuit. Additionally, Kunde does not disclose a signal-conditioning circuit in which an offset correction voltage at the non-inverting input compensates to drive an output voltage of the signal-conditioning circuit to an input voltage divided by a value of two by calibration for temperature compensation thereof by the signal-conditioning circuit. These features are disclosed in claim 1, from which claim 2 depends. Similar arguments also apply to claims 11, 16, and 26. Kunde additionally does not disclose, teach or suggest a temperature compensation circuitry and methodology of the type taught by Applicants' invention. In fact, Kunde does not discuss temperature compensation at all. Instead, Kunde describes a system for sensing and indicating the angular position of a shaft through 360 degrees of rotation using a two-axis magnetoresistive microcircuit, a two pole magnet which rotates with the input shaft, a two channel operational amplifier, and an electromechanical device to provide shaft angle indication. Temperature compensation is not achieved by the circuitry of Kunde.

Also, the Examiner has not adequately explained how the use of InSb as the material for forming the magnetoresistors would have been obvious to those having ordinary skill in the art. Additionally, the Examiner has not provided an explanation of why one skilled in the art would have been motivated to combine the use InSb as the material for forming the magnetoresistors for use in a signal-conditioning circuit as claimed by Applicant. Without an adequate explanation of motivation as such, a rejection to claims 2, 11, 16 and 26 under 35 U.S.C. §103(a) as being unpatentable over Kunde should be withdrawn. Applicants therefore requests withdrawal of the rejection to claims 2, 11, 16 and 26 under 35 U.S.C. §103(a).

V. Conclusion

Applicants have amended the claims to more particularly disclose the invention claimed thereof. It is believed that support for such amendments is provided within the specification, and that the specification adequately enables such amendments. No new subject matter has been introduced as a result of this amendment. Attached hereto is a marked-up version of the changes made to the claims by the current response, which is captioned "VERSIONS WITH MARKING TO SHOW CHANGES MADE." Applicants respectfully submit that the foregoing discussion does not present new issues for consideration and that no new search is necessitated.

Applicants have therefore responded to each and every objection and rejection of the Official Action, and respectfully request that a timely Notice of Allowance be issued. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objections and the rejections under 35 U.S.C. §112, §102 and §103, and further examination of the present application.

In view of the above remarks, allowance of all claims pending is respectfully requested. If a telephone conference would be of assistance in advancing the prosecution of this application, the Examiner is invited to call applicants' attorney at the below-indicated telephone number.

Respectfully submitted,

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VERSIONS WITH MARKING TO SHOW CHANGES MADE

Claim 29 has been cancelled. Please amend claims 1, 3, 4-8, 11-15, 17-18, 20 and 25-28 as follows:

1. (Amended) A method for signal-conditioning utilizing a signal-conditioning circuit, said method comprising the steps ~~step~~ of:

applying an offset correction voltage to a noninverting input of an amplifier of said ~~a~~ signal-conditioning circuit; and

applying a magnetoresistor half-bridge signal to an inverting input of said amplifier said signal-conditioning circuit~~;~~, wherein said offset correction ~~compensating a~~ voltage at said noninverting input compensates to drive an output voltage of said signal-conditioning circuit to an input voltage divided by a value of two by calibration~~, thereby permitting said signal-conditioning circuit to contain~~ for temperature compensation thereof by said signal-conditioning circuit ~~capabilities~~.

2. (Nonamended) The method of claim 1 further comprising the step of:

configuring said signal-conditioning circuit to comprise an InSb signal-conditioning circuit.

3. (Amended) The method of claim 1 further comprising the step of:

configuring said signal-conditioning circuit as a circuit comprising:

a noninverting signal input for application of offset correction voltages;

an inverting input for application of magnetoresistor half bridge signals for temperature compensation thereof~~; and~~

~~a temperature compensator~~.

4. (Amended) The method of claim 1 further comprising the step of:

generating said magnetoresistor half-bridge signal utilizing at least one ~~equivalent~~ magnetoresistor ~~configured within said signal-conditioning circuit~~.

5. (Amended) The method of claim 1 further comprising the step of:

generating said magnetoresistor half-bridge signal utilizing a plurality of magnetoresistors ~~configured within said signal-conditioning circuit~~.

6. (Amended) The method of claim 1 further comprising the step of:

connecting ~~configuring said signal-conditioning circuit to comprise~~ at least two magnetoresistors to one another at a first node and at least two other magnetoresistors to one another at a second node, wherein said second node is connected to a positive input of said amplifier of said signal-conditioning circuit.

7. (Amended) The method of claim 1 further comprising the step of:

coupling ~~configuring said signal-conditioning circuit to comprise~~ a first magnetoresistor coupled to a second magnetoresistor at a first node, wherein said first magnetoresistor is coupled to a supply voltage and said second magnetoresistor is coupled to a ground.

8. (Amended) The method of claim 7 further comprising the step of:

coupling ~~configuring said signal-conditioning circuit to~~ comprise a first resistor coupled to a second resistor at a second node, wherein said first resistor is coupled to said supply voltage and said second resistor is coupled to said ground, such that said second node is coupled to a positive input of said amplifier.

9. (Nonamended) The method of claim 8 further comprising the step of:

configuring said signal-conditioning circuit to comprise a third resistor coupled to said first node and to a third node, wherein said third node is connected to a negative input of said amplifier.

10. (Nonamended) The method of claim 9 further comprising the step of:

configuring said signal-conditioning circuit to comprise a fourth resistor coupled to said third node and to an output of said amplifier.

11. (Amended) The method of claim 1 further comprising the step of:

configuring said signal-conditioning circuit to comprise at least one magnetoresistor in series with at least one resistor connected to ~~located in~~ an inverting input of an amplifier of ~~associated with~~ said signal-conditioning circuit;

wherein said at least one magnetoresistor comprises an InSb magnetoresistor that exhibits a negative scale factor temperature coefficient; and

wherein at least one magnet of said signal-conditioning circuit ~~an associated magnet~~ exhibits a negative scale factor temperature coefficient to thereby permit a gain of said amplifier to increase.

12. (Amended) The method of claim 11 further comprising the step of:

configuring said at least one resistor to comprise a fixed ~~low~~ temperature coefficient resistor.

13. (Amended) The method of claim 12 further comprising the step of:

choosing said fixed low temperature coefficient resistor in series with said at least one magnetoresistor to thereby obtain a flat resultant temperature coefficient thereof dependent upon said fixed low temperature coefficient resistor.

14. (Amended) A method for signal-conditioning utilizing a signal-conditioning circuit, said method comprising the step of:

applying an offset correction voltage to a noninverting input of a signal-conditioning circuit;

applying a magnetoresistor half-bridge signal to an inverting input of said signal-conditioning circuit~~;~~, wherein said offset correction ~~compensating a~~ voltage at said noninverting input compensates to drive an output voltage of said signal-conditioning circuit to an input voltage divided by a value of two ~~by calibration thereof~~ for temperature compensation thereof by said signal-conditioning circuit;

configuring said signal-conditioning circuit to comprise at least one magnetoresistor in series with at least one resistor located in an inverting input of an amplifier associated with said signal-conditioning circuit;

wherein said at least one magnetoresistor exhibits a negative scale factor temperature coefficient; and

wherein an associated magnet exhibits a negative scale factor temperature coefficient to thereby permit a gain of said amplifier to increase with temperature.

15. (Amended) A system for signal-conditioning utilizing a signal-conditioning circuit, said system comprising:

an offset correction voltage applied to a noninverting input of a signal-conditioning circuit;

a magnetoresistor half-bridge signal applied to an inverting input of said signal-conditioning circuit~~; and~~, wherein said offset correction ~~a~~ voltage ~~compensated~~ compensates ~~at said noninverting input~~ to drive an output voltage of said signal-conditioning circuit to an input voltage divided by a value of two by calibration for temperature compensation thereof by said signal-condition circuit.

16. (Nonamended) The system of claim 15 wherein said signal-conditioning circuit comprises an InSb signal-conditioning circuit.

17. (Amended) The system of claim 15 wherein said signal-conditioning circuit comprises:

a noninverting signal input for application of offset correction voltages;

an inverting input for application of magnetoresistor half bridge signals for temperature compensation thereof~~; and~~

~~a temperature compensator~~.

18. (Amended) The system of claim 15 wherein said magnetoresistor half-bridge signal is generated utilizing at least one ~~equivalent~~ magnetoresistor configured within said signal-conditioning circuit.

19. (Nonamended) The system of claim 15 wherein said magnetoresistor half-bridge signal is generated utilizing a plurality of magnetoresistors configured within said signal-conditioning circuit.

20. (Amended) The system of claim 15 wherein ~~said signal-conditioning circuit comprises~~ at least two magnetoresistors <u>are connected to one another at a first node and at least two other magnetoresistors to one another at a second node, wherein said second node is connected to a positive input of said amplifier of said signal-conditioning circuit</u>.

21. (Nonamended) The system of claim 15 wherein said signal-conditioning circuit comprises a first magnetoresistor coupled to a second magnetoresistor at a first node, wherein said first magnetoresistor is coupled to a supply voltage and said second magnetoresistor is coupled to a ground.

22. (Nonamended) The system of claim 21 wherein said signal-conditioning circuit comprises a first resistor coupled to a second resistor at a second node, wherein said first resistor is coupled to said supply voltage and said second resistor is coupled to said ground, such that said second node is coupled to a positive input of said amplifier.

23. (Nonamended) The method of claim 22 wherein said signal-conditioning circuit comprises a third resistor coupled to said first node and to a third node, wherein said third node is connected to a negative input of said amplifier.

24. (Nonamended) The system of claim 23 wherein said signal-conditioning circuit comprises a fourth resistor coupled to said third node and to an output of said amplifier.

25. (Amended) The system of claim 15 <u>wherein</u> ~~further comprising~~:

said signal-conditioning circuit <u>comprises</u> ~~comprising~~ at least one magnetoresistor in series with at least one resistor located in an inverting input of an amplifier associated with said signal-conditioning circuit;

wherein said at least one magnetoresistor comprises an InSb that exhibits a negative scale factor temperature coefficient; and

wherein an associated magnet exhibits a negative scale factor temperature coefficient to thereby permit a gain of said amplifier to increase with temperature.

26. (Amended) The system of claim 25 wherein said at least one resistor comprises a fixed ~~low~~ temperature coefficient resistor.

27. (Amended) The system of claim 26 wherein said fixed low temperature coefficient resistor is chosen in series with said at least one magnetoresistor to thereby obtain a flat resultant scale factor temperature coefficient thereof dependent upon said fixed low temperature coefficient resistor.

28. (Amended) A system for signal-conditioning utilizing a signal-conditioning circuit, said system comprising:

an offset correction voltage applied to a noninverting input of a signal-conditioning circuit;

a magnetoresistor half-bridge signal applied to an inverting input of said signal-conditioning circuit;

a voltage compensated at said noninverting input to drive an output voltage of said signal-conditioning circuit to an input voltage divided by a value of two by calibration thereof;

wherein said signal-conditioning circuit is configured to comprise at least one magnetoresistor in series with at least one resistor connected to ~~located in~~ an inverting input of an amplifier of ~~associated with~~ said signal-conditioning circuit;

wherein said at least one magnetoresistor exhibits a negative scale factor temperature coefficient; and

wherein at least one magnet of said signal-conditioning circuit ~~an associated magnet~~ exhibits a negative scale factor temperature coefficient to thereby permit a gain of said amplifier to increase with temperature.

?? how does a magnet of the SC OA permit a gain of amp to ↑ w/ temp

29. (CANCELLED) ~~An InSb signal-conditioning circuit, comprising:~~

~~a noninverting signal input for application of offset correction voltages;~~

~~an inverting input for application of magnetoresistor half-bridge signals; and a temperature compensator.~~